Patent Claims:

1. Method for determining the rotor position of a stationary or slowly rotating synchronous machine by evaluating electrical test pulses that are obtained by applying voltage pulses to the individual phase windings of the stator, wherein changes in the inductance of the phase windings which are caused by saturation of the stator iron depending on the rotor position, are determined in opposite directions of current by calculating differences in the amount of current of two test pulses, and angle values being predetermined by the number of the phase windings are associated with the differences in the amount of current,
c h a r a c t e r i z e d in that prior to the first test pulse I_{meas1}, a bias pulse I_{bias} whose polarity is inverted in relation to the first pulse I_{meas1} is generated, with the switch-on times t_1 of the associated voltage pulses U_{bias} and $-U_{meas1}$ being equal, and in that the respectively first test pulse I_{meas1} generated in the corresponding phase winding (U, V, W) acts as a bias pulse in the same phase winding (U, V, W).

2. Method as claimed in claim 1,
c h a r a c t e r i z e d in that defined angle offset values are added to angle values being associated with the differences in the amount of current ΔI when the test pulses I_{meas} are evaluated, and the so produced pairs of values are compared with a

reference characteristic curve, and the sum of the squares of the comparison results is produced and stored together with the associated angle offset value in a memory, whereupon the minimum of the sum is determined and the associated angle offset value ϕ_{start} is issued as the measured rotor position.

3. Method as claimed in claim 2, c h a r a c t e r i z e d in that the angle offset values are limited to an angular range being defined by the evaluation of the signs of the established differences in the amount of current.

4. Method as claimed in claim 2 or 3, c h a r a c t e r i z e d in that several cycles of evaluation are performed consecutively with decreasing distances between the angle values.

5. Method as claimed in any one of claims 1 to 4, c h a r a c t e r i z e d in that one or more compensation pulses U_{comp} are generated in order to increase the current decline gradient of the biasing pulse I_{bias} and the test pulses I_{meas}.

6. Method as claimed in any one of claims 1 to 5, c h a r a c t e r i z e d in that two or more phase windings are connected with defined potentials for a fixed time t_1 in order to generate a test pulse I_{meas}.

7. Method as claimed in any one of claims 1 to 5, c h a r a c t e r i z e d in that in order to generate a test pulse I_{meas} in motors having a star

connection, one or more phase windings and the star point are connected with defined potentials for a fixed time t_1.

8. Method as claimed in claim 6 or 7, c h a r a c t e r i z e d in that the fixed time t_1 is chosen depending on the voltage U_{meas} necessary to produce the test pulses I_{meas} and applied to the phase windings.

9. Method as claimed in claim 8, c h a r a c t e r i z e d in that the fixed time t_1 is chosen depending on the temperature of the synchronous machine 1.

10. Method as claimed in any one of claims 6 to 9, c h a r a c t e r i z e d in that the fixed time t_1 is gradually extended until a desired current amplitude of the test pulse I_{meas} is reached.

11. Method as claimed in any one of claims 1 to 10, c h a r a c t e r i z e d in that the current amplitude of all test pulses I_{meas} is determined using one single means of measurement.

12. Method as claimed in any one of claims 1 to 10, c h a r a c t e r i z e d in that a current measuring device serving to determine the current amplitude of all test pulses I_{meas} is associated with the synchronous machine (1).

13. Method as claimed in any one of claims 5 to 12, c h a r a c t e r i z e d in that the change in the rotor position due to the moment reaction of the test pulses I_{meas} is measured, and the angle values associated with the differences of the amount of current are corrected depending on the measurement.

14. Method as claimed in any one of claims 2 to 13, c h a r a c t e r i z e d in that the reference characteristic curve is adapted to the detected differences of the amount of current.

15. Method as claimed in any one of claims 1 to 14, c h a r a c t e r i z e d in that the voltage applied to the phase windings is monitored during the switch-on time t_1 of the voltage pulses U_{meas}, and the test pulse I_{meas} is repeated in the event of a deviation from a predetermined tolerance.

16. Method as claimed in any one of claims 1 to 15, c h a r a c t e r i z e d in that the current amplitude I_{meas} of the voltage pulses U_{meas} is monitored during their switch-on time t_1, and that the test pulse I_{meas} is repeated in the event of a deviation from a predetermined tolerance.

17. Method as claimed in any one of claims 2 to 16, c h a r a c t e r i z e d in that the minimum of the sum of the squares of the comparison results is used as a criterion of the quality of the determination of the rotor position.